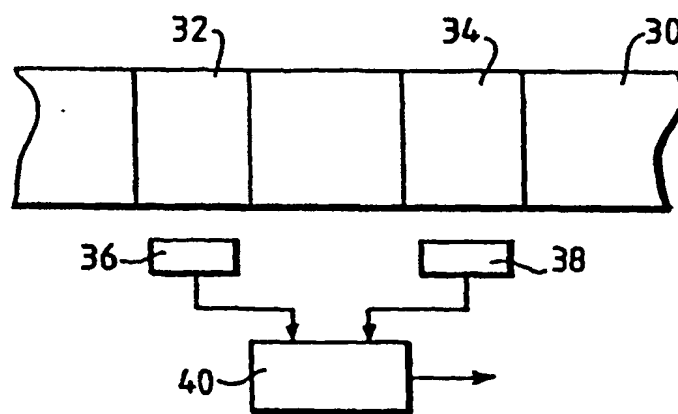




INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

| | | |
|---|-----------|---|
| (51) International Patent Classification 7 : G01L 3/10 | A1 | (11) International Publication Number: WO 00/57150 (43) International Publication Date: 28 September 2000 (28.09.00) |
| (21) International Application Number: PCT/GB00/01103 (22) International Filing Date: 23 March 2000 (23.03.00) (30) Priority Data: 9906735.7 23 March 1999 (23.03.99) GB (71) Applicant (for all designated States except US): FAST TECHNOLOGY GMBH [DE/DE]; Otto Hahn Street 24, Gewerbegebiet Riemerling, D-85521 Ottobrunn (DE). (72) Inventors; and (75) Inventors/Applicants (for US only): MAY, Lutz, Axel [DE/GB]; 3 The Grange, Enborne, Newbury, Berkshire RG14 6RJ (GB). OWSLEY, John [GB/GB]; Hollymead House, Garden Close Lane, Newbury, Berkshire RG14 6PP (GB). (74) Agent: BLUFF, John, William; Lloyd Wise, Tregear & Co., Commonwealth House, 1-19 New Oxford Street, London WC1A 1LW (GB). | | (81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG). Published <i>With international search report.</i> |

(54) Title: MAGNETISED TORQUE TRANSDUCER ELEMENTS**(57) Abstract**

The problem of magnetoelastic circumferentially-magnetised torque transducers having a zero output magnetic field at zero torque is solved by pre-torquing. This entails circumferentially magnetising the transducer element at a predetermined torque. The technique is advantageously applied to a pair of transducer elements (32, 34; 62, 64) whose outputs are combined (Fig. 6a: 76) to provide a range of measurement of torque (clockwise and counterclockwise) including zero torque. Various combinations of direction of pre-torque and direction of circumferential-magnetisation are discussed. A circuit (Fig. 8) is disclosed for combining the signals to obtain a reference level (84) for gain control of the combined output signals V_o from the two transducer elements (60, 62). Also disclosed is the application of the invention to other forms of torque transducer element in which a magnetic field is stored. One form is longitudinal magnetisation (Fig. 10a). Another is radially spaced magnetisation (Fig. 12a: Fig. 13).

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INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

| | | |
|---------------------------------------|---|---|
| Applicant's or agent's file reference | FOR FURTHER ACTION see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below. | |
| International application No. | International filing date (day/month/year) | (Earliest) Priority Date (day/month/year) |
| PCT/GB 00/ 01103 | 23/03/2000 | 23/03/1999 |
| Applicant | | |
| FAST TECHNOLOGY GMBH et al. | | |

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :

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☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

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2. ☐ **Certain claims were found unsearchable** (See Box I).

3. ☐ **Unity of invention is lacking** (see Box II).

4. With regard to the **title**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

☒ the text is approved as submitted by the applicant.

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6. The figure of the **drawings** to be published with the abstract is Figure No.

☐ as suggested by the applicant.

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☒ because this figure better characterizes the invention.

6

☐ None of the figures.

INTERNATIONAL SEARCH REPORT

International Application No
PCT/GB 00/01103

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 G01L3/10

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 G01L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
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| X | DE 34 37 379 A (BENTLY NEVADA CORP) 25 April 1985 (1985-04-25) | 1-3,7,9, 11-15, 17-20 |
| Y | abstract; figures 2-4 | 10 |
| A | page 15, line 3 -page 17, line 11 --- -/-- | 4-6,8, 16,21,22 |

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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Date of the actual completion of the international search

8 June 2000

Date of mailing of the international search report

20/06/2000

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INTERNATIONAL SEARCH REPORT

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

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| X | HARADA K ET AL: "A new torque transducer using stress sensitive amorphous ribbons" PROCEEDINGS OF THE THIRD JOINT INTERMAG-MAGNETISM AND MAGNETIC MATERIALS CONFERENCE, MONTREAL, QUE., CANADA, 20-23 JULY 1982, vol. MAG-18, no. 6, pages 1767-1769, XP000606539 IEEE Transactions on Magnetics, Nov. 1982, USA ISSN: 0018-9464 | 1-3,7,9, 11-15, 17-20 |
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| X | EP 0 321 662 A (KUBOTA LTD) 28 June 1989 (1989-06-28) | 1-9, 11-22 |
| Y | abstract; figures 1-10 column 5, line 34 -column 9, line 58 | 10 |
| Y | US 4 697 460 A (SUGIYAMA JUN ET AL) 6 October 1987 (1987-10-06) abstract; figures 1-6 | 10 |
| A | column 4, line 29 -column 6, line 30 | 1-9, 11-22 |

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 00/01103

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